

# Poverty's Grip on Education: Exploring the Impact of Socioeconomic Factors on High School Graduation Rates in California

Ethan Zhang\*

\*(Carlmont High School, Email: [ezhang0606@gmail.com](mailto:ezhang0606@gmail.com))

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## Abstract:

This study contributes to the existing literature on the relationship between poverty and educational outcomes, focusing specifically on the impact of poverty-induced factors on educational quality. By analyzing specific conditions within California school districts, we aim to deepen our understanding of this topic. Using data from the California Department of Education, we examine the association between district funding and high school graduation rates. Additionally, we investigate the relationship between the percentage of students eligible for free or reduced price meals and graduation rates. Through regression analysis, we elucidate the intricate relationship between district funding, the proportion of students eligible for free or reduced price meals, and high school graduation rates in California. By shedding light on these relationships, this study provides insights into how poverty-related factors influence the quality of education in the context of California. These findings can inform policymakers, educators, and stakeholders in their efforts to address the educational challenges faced by underserved students in the state.

*Keywords* — Education, Graduation Rates, Social Sciences, Poverty

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## I. INTRODUCTION

In recent years, poverty rates have been on an upward trajectory, exacerbated by the economic impact of COVID-19 [13]. Despite progress in education and other areas, many have faced increased financial hardships due to the pandemic. The rise in poverty has negatively impacted low-income communities, creating disparities in educational resources and opportunities. Consequently, the quality of education in these areas has declined, leading to lower high school

graduation rates across California. Addressing the link between poverty and education is crucial to ensure equitable opportunities for all students in the state. Numerous studies have investigated the relationship between poverty and education in the Southern States, Massachusetts, and Pennsylvania [4, 8-9]. Studying poverty's impact on education is vital for addressing challenges faced by disadvantaged students and developing targeted interventions that provide equal educational opportunities. These studies examine various

factors that directly influence academic performance, including income, race, and ethnicity. Houck, Kurtz, Karoly and Murnane consistently find that economically disadvantaged communities tend to have lower rates of academic achievement. The implications and conclusions of these studies warrant further exploration. This study aims to investigate the direct impact of various poverty aspects on education and academic performance among high school students in California, addressing the need for similar research in the author's home state. We seek to determine whether similar dynamics between socioeconomic factors and education hold true in California or if there are other unique factors at play. By tracking key variables, such as current expense per ADA and the percentage of students eligible for free or reduced-price meals, we aim to observe their relationship with high school graduation rates, which serves as a reliable indicator of education quality, reflecting successful student outcomes and the effectiveness of the education system. Through this analysis, we strive to provide valuable insights into how poverty-related factors influence the quality of education in California, shedding light on the educational challenges faced by underserved students in the state.

## **II. LITERATURE REVIEW**

A 2010 study conducted by Eric A. Houck and Adam Kurtz examines the impact of school finances on high school graduation rates within the Southern Regional Education Board. Houck and Kurtz emphasize the importance of graduation rates as a reliable measure of a school's success in providing equal opportunities to all its students. Their study considers various factors that potentially influence graduation rates and analyzes whether they have a positive or negative effect. Houck and Kurtz account for a variety of variables surrounding the expenses of schools and conclude that while funding in the South does have a positive impact on graduation rates, the effect is relatively

subtle. Instead, they find that higher percentages of students receiving free or reduced lunches are associated with a decrease in district-level graduation rates. This finding suggests that the proportion of students eligible for meal assistance serves as a better indicator of a factor that affects academic performance [4].

A 2013 study by Richard J. Murnane investigates how race and socioeconomic status affects quality of education. To begin, Murnane discerns how lower socioeconomic status of families in Massachusetts lead to decreased high school graduation rates in Massachusetts. However, he also goes beyond state-level analysis to a national level and examines how the United States economy throughout the decades may affect graduation rates. Through his findings, he notes that economic stagnation is a direct cause of lower academic performance. Murnane's research delves into the influence of race on academic success, specifically focusing on Black and Hispanic individuals and comparing their achievements to those of white students. By analyzing school statistics, he finds that Black and Hispanic students tend to exhibit lower performance in mathematics and reading when compared to their white peers [8].

A 2015 study done by Lynn A. Karoly shares similar findings to Murnane and also demonstrates the influence of socioeconomic status and race on high school graduation rates in various states. Karoly's study focuses on the academic performance of disadvantaged students in Pennsylvania, specifically examining gaps related to their specific backgrounds. She initially explores the impact of race and ethnicity by comparing the academic performance of non-Hispanic white students with African-American and Latino students. Karoly then delves into disparities in economic status among families, analyzing the performance differences between higher-income and lower-income students. Her conclusions show a direct correlation between race, socioeconomic background and graduation rates, displaying

decreased high school graduation rates in Pennsylvania among African American students, Latino students, and students of lower socioeconomic status [9].

Both Karoly and Muranne's research conclude race is one of the factors that affect high school graduation rates. However, there is a study conducted by The Journal of Blacks in Higher Education that contradicts these findings. According to this study, race itself is not a determining factor; instead, it is the combination of race and economic status that plays a crucial role as race and socioeconomic factors can be highly correlated. The Journal of Blacks in Higher Education claims that when comparing graduation rates between black and white individuals, there is no clear relationship, as there exists scenarios where the graduation rate of Black students is higher than that of white individuals. They also highlight "under conditions of poverty and poor educational opportunity whites drop out of college at the same or higher rates than blacks" [1].

Due to the need for further research on the topic of race, our study does not include race as a factor of interest in our research. Instead, our focus is on utilizing social and economic data to analyze their relationship with the quality of high school education in the state of California. By using data released by the California Department of education, our intention is to identify how socioeconomic factors, including school funding and the percentages of students eligible for free or reduced-price meals, directly affect high school graduation rates in California.

### **III. INDEPENDENT AND DEPENDENT VARIABLES**

We examined the dimensions of poverty in order to develop a list of relevant variables for the study. Prior research, including the study conducted by Alkire and Santos, has highlighted the significance of a multi-dimensional understanding of poverty, acknowledging the existence of various factors [7].

How we define poverty is also crucial as it directly influences policy-making efforts aimed at poverty reduction [2]. Consequently, in this paper, we also embrace a multidimensional approach, with a particular emphasis on income and educational opportunities as key indicators of poverty. Income is widely recognized as the primary determinant of poverty status, as individuals lacking sufficient income fall below the poverty line and are considered impoverished [2]. The absence or deficiency of income hinders access to basic necessities. However, poverty can also be defined as a lack of resources, including access to vital elements such as proper education, which in turn perpetuates poverty. Undoubtedly, basic necessities including food, water, and shelter are imperative for human survival. However, transcending these fundamental requirements, educational opportunities are necessary for the success of individuals. Education equips people with critical thinking skills, analytical abilities, and practical knowledge necessary for aspects of adulthood such as securing employment, owning a home, and starting a family.

This study encompasses the examination of both insufficient income and the lack of resources as poverty factors. To implement these factors, we utilize two independent variables: current expenses per Average Daily Attendance (ADA) in each district and percentage of students who qualified for free or reduced-price meals in each school. School expenses per student represents resources available to each student and are regulated by school funding, primarily determined by local taxes derived from the income of the community's residents. Notably, communities with higher percentages of low-wage earners tend to have lower total tax contributions, resulting in diminished school funding. Insufficient funding directly contributes to a range of issues in education, including the presence of under-qualified teachers, overcrowded classrooms, and limited extracurricular programs. Insufficiently qualified teachers and overcrowded classrooms significantly

hamper students' development by limiting their access to personalized attention tailored to their individual needs [10]. Furthermore, the lack of adequate extracurricular programs further impedes students' growth, denying them opportunities for social interaction, teamwork, creativity, and inhibiting their overall personal development. Additionally, the percentage of students qualified for reduced-price meals serves as an indicator of the socioeconomic status of each family, as eligibility is primarily determined by family income. By analyzing these factors, we are able to determine the relationship between poverty and education.

Recognizing poverty as a multifaceted concept encompassing both economic factors and limited access to educational resources, we selected current expense per ADA and percentage of students eligible for free or reduced-price meals to capture the major dimensions of poverty that have a direct impact on education. To evaluate the overall quality of education, we use high school graduation rate as the selected dependent variable. This metric serves as a reliable indicator of the effectiveness of schools in facilitating student success and educational outcomes. By examining the graduation rate, we are able to gauge the extent to which schools effectively educate students, aid in the completion of their high school education, and enable them to transition into higher education or entry into the workforce [11].

TABLE 1. INDEPENDENT AND DEPENDENT VARIABLES

Dataset	Fields	Role
Expense	Current Expense Per ADA	Independent Variable
Free or Reduced-Price Meals	Percent (%) Eligible FRPM	Independent Variable
Graduation Rate	Regular HS Diploma Graduation (Rate)	Dependent Variable

#### IV. RESEARCH CONTEXT

Poverty remains one of the most severe global challenges, affecting billions of people worldwide. It is primarily caused by a lack of income and

essential resources necessary for sustainable livelihoods, resulting in numerous disadvantages in all aspects of life. For instance, individuals living in poverty often face limited access to educational opportunities, particularly those residing in impoverished communities. The funding of schools, which heavily relies on local taxes, means that impoverished communities struggle to afford adequate educational facilities, leading to a subpar primary and secondary education for students. Additionally, impoverished individuals sometimes cannot afford the demanding prices of higher education, even with financial aid. Scholarships become the only viable option, yet they are highly competitive and difficult to obtain especially with less education opportunities that impoverished people already face [6].

As a result, individuals from impoverished communities are often unable to access proper education and may face multiple obstacles to graduate from high school depending on the conditions of their local schools. Without adequate education, it is much more difficult to obtain employment opportunities. Today, most white-collar jobs require some form of college degree as they are not labor-focused and instead require specialized skills developed from higher education. Generally, individuals who lack education have a difficult time obtaining a college degree. Due to their limited educational opportunities, individuals from underserved communities often find themselves restricted to lower-paying blue-collar jobs, which can result in a lack of resources compared to those with higher-paying jobs. This economic disparity can perpetuate a cycle of financial hardship and reduced access to essential resources, further exacerbating the challenges faced by individuals in these communities. With the growing population, the job market has become increasingly competitive, with a limited amount of opportunities for applicants [12]. Without a stable source of income from employment, individuals are likely to fall into the cycle of poverty. Therefore the

lack of employment opportunities, caused by inadequate education, perpetuates income inequality and contributes to an endless cycle of poverty. The cyclical nature of poverty is what makes it so devastating and so difficult to escape.

## **V. DATA COLLECTION**

The primary objective of this study is to examine the relationship between poverty and education within California. To achieve this goal, our research focuses on identifying and analyzing specific independent variables that are directly associated with poverty. In particular, we use two independent variables for investigation: current school expense per Average Daily Attendance (ADA) and the percentage of students eligible for free or reduced-price meals.

This study analyzes data from the California Department of Education, a publicly available and trusted source. Utilizing these datasets provided comprehensive and reliable information to investigate the relationship between poverty and education in California. However, it's important to acknowledge potential flaws with public datasets, including those from the California Department of Education, as some schools or districts may not fully report all necessary data points, leading to instances of missing or incomplete information.

### **A. High School Graduation Rate**

To begin the data collection process, we collected data on cohort graduation rate and outcomes from the California Department of Education [14]. After downloading the dataset, we applied filters to remove irrelevant data, such as amount of individuals who met UC and CSU graduation requirements, focusing solely on high school graduation rates. It should be noted that the data is available at various aggregate levels, necessitating additional filtering to isolate the high school graduation rates by district and school levels

### **B. Current Expense Per ADA**

Next, we obtained data on the current expenses per ADA from the California Department of Education's archives [14]. By filtering out extraneous information about different school expenses, we extracted the relevant data on current expenses per ADA. However, the dataset only offered information at the district aggregate level. Consequently, we adjusted our analysis accordingly and utilized the district-level aggregate for both the high school graduation rate and the current expense per ADA data

### **C. Percentage of Students Eligible for Free or Reduced-Price Meals**

Finally, we collected data on the percentages of students eligible for free or reduced-price meals, also from the California Department of Education [14]. It's important to note that this dataset encompassed various school levels, including elementary, middle, high schools, and K-12 schools. To focus solely on high schools (grades 9-12), we filtered the data accordingly. Additionally, the dataset provided information at the school level, prompting us to align the high school graduation rate analysis at the school aggregate level rather than the district level.

### **D. Academic Years 2021-2022**

To ensure the relevance and accuracy of the findings, we utilized data from the most recent academic years, 2021-2022. By selecting data from this period, our study aimed to capture the most up-to-date state of education. Had we used older data, the results and conclusions would be less relevant as it would not have taken into account any recent changes in policies, funding, and socioeconomic dynamics that may influence education. By relying on up-to-date data, this research provided valuable insights into the current relationship between educational expenditures, student demographics, and high school graduation rates.

## **VI. DATA ANALYSIS**

In this study, we conducted a thorough study using linear regression models and correlation coefficients to examine the relationship between key variables. Linear regression models allow us to assess the strength and direction of relationships, such as graduation rate and factors like current expense per ADA or percentage of students eligible for free or reduced-price meals. By utilizing linear regression models, we assessed the statistical significance of the variables under investigation. This analysis allowed us to distinguish between mere coincidental relationships and genuine connections in the field of education. Through this analysis, we were able to draw conclusions that could help inform decisions regarding the impact of various factors on education.

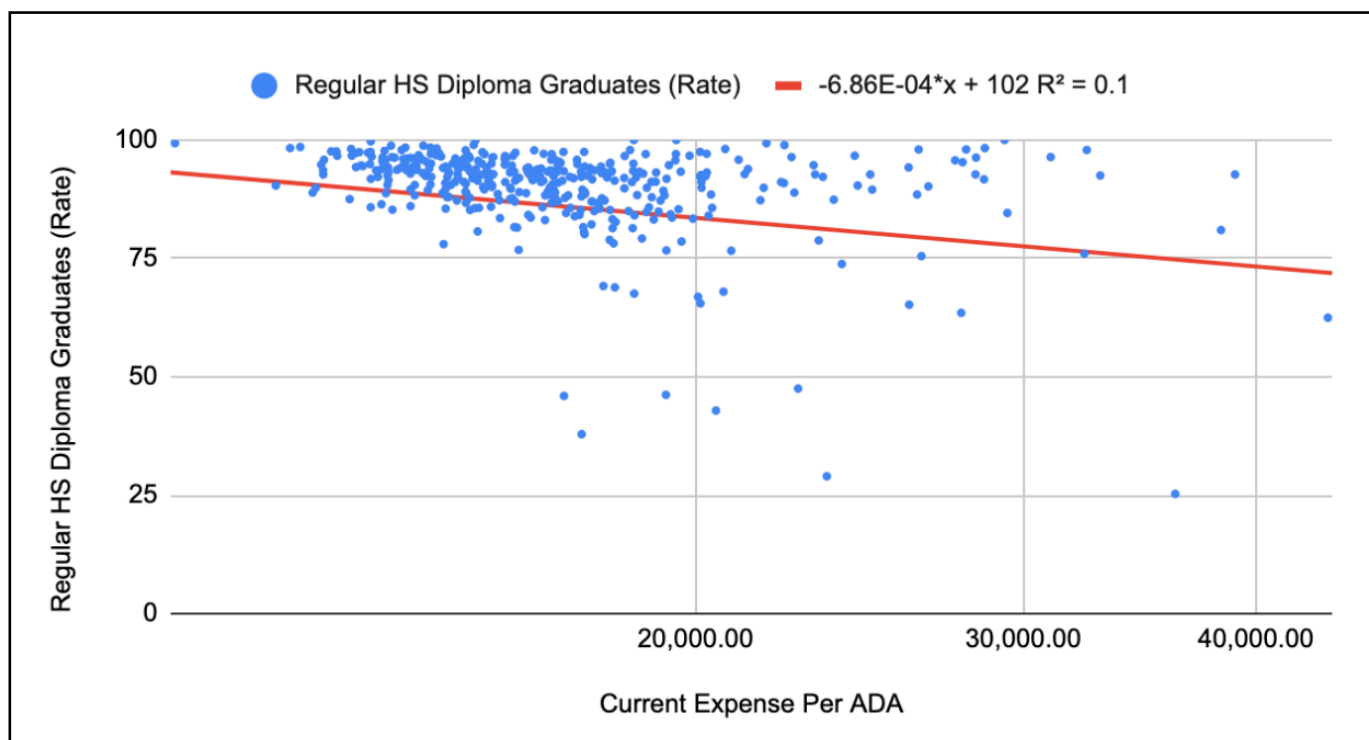
We generated separate linear regression models for each independent variable, filtering the data to focus on high school graduation rate, current expense per ADA, and percent of students eligible for free or reduced-price meals in public high schools. Through scatter plots and the line of best fit, we visualized patterns and trends, estimating the relationship between data points. We also calculated the coefficient of determination ( $R^2$ ) and

correlation coefficients to understand the strength and direction of the relationships. This comprehensive data analysis approach deepened our understanding of how poverty-induced factors impact education quality.

**A. High School Graduation Rate vs. Current Expense per ADA**

In our initial analysis, we focused on examining the relationship between high school graduation rate and current expense per ADA. Based on the data collection, the analysis of current expense per ADA data is specifically focused on a district level. Through careful examination, we observed a small correlation between these two variables. We used the scatter plot and calculated the line of best fit in order to estimate the overall negative trend represented by the data points. In order to measure the proportion of variation in the graduation rate and school funding, we calculated the  $R^2$ , revealed to be .1. This indicates that approximately 10% of the variation in graduation rates can be attributed to differences in current expense per ADA. Furthermore, to assess the strength and direction of the relationship between the two variables, we determined the correlation coefficient. Our analysis

Fig. 1 Regular HS Diploma Graduates (Rate) vs. Current Expense Per ADA



revealed a slight negative correlation of -0.316, indicating that as the current expense per ADA increased, there was a tendency for the high school graduation rate to decrease. This finding suggests that higher current expense per ADA is associated with lower graduation rates.

**B. High School Graduation Rate vs. Percentage of Students Eligible for Free or Reduced-Price Meals**

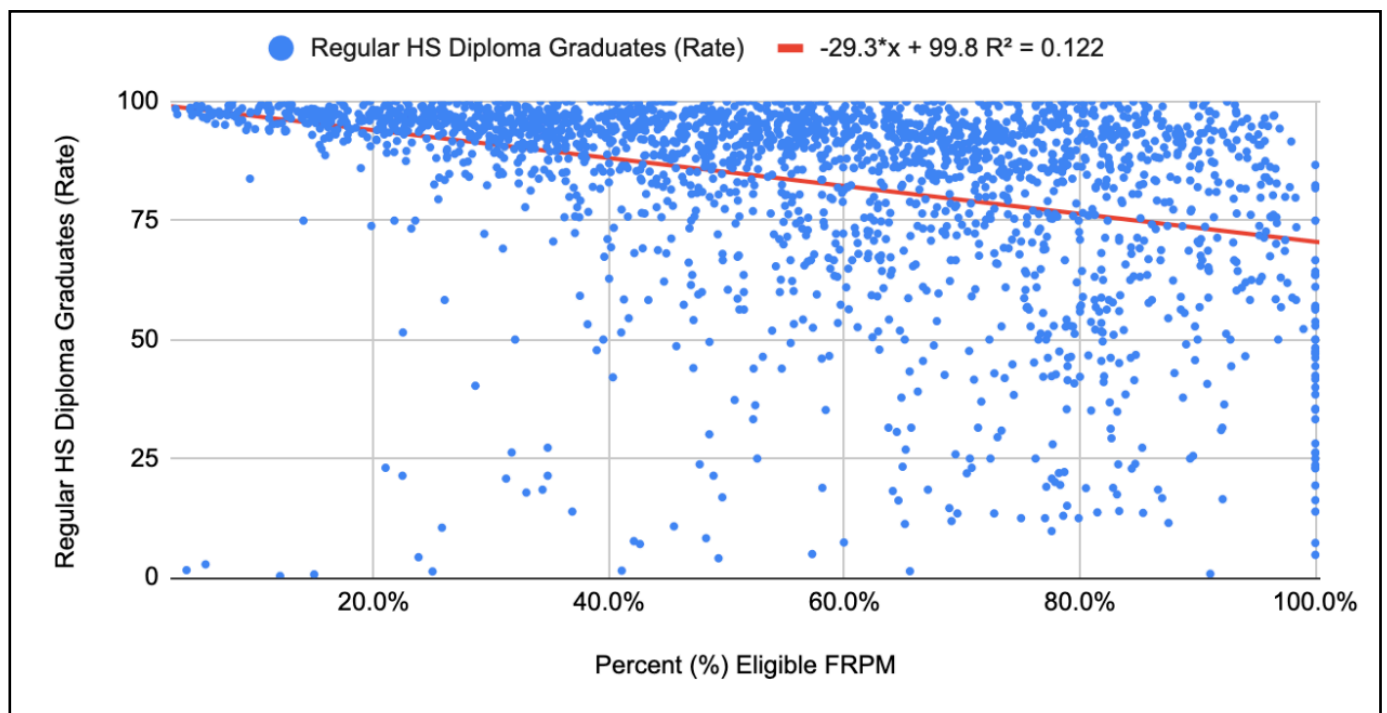
In our second analysis, we compared the relationship between high school graduation rate and percentage of individuals eligible for free or reduced-price meals. As referenced by the data collection, all information pertaining to student eligibility is recorded and analyzed at a school level. Again, there we discovered a small correlation between the two variables. By creating a scatter plot and calculating the line of best fit, we were able to estimate the trend and found there to be a negative relationship. This downward trend is also confirmed by calculating the correlation coefficient between the two variables, estimated to be approximately -0.350. The proportion of variation in the graduation rate explained by the regression ( $R^2$ ) was found to be .122. This signifies that approximately 12.2% of the variation

in graduation rates can be attributed to differences in percent of students eligible for free or reduced-price meals. The negative relationship indicates a higher percentage of students eligible for free or reduced-price meals is correlated with lower graduation rates.

**VII. DISCUSSION AND CONCLUSIONS**

Our findings about the relationship between current expense per ADA and high school graduation rate may appear counterintuitive at first glance, as one might expect higher school expenses to positively impact graduation rates. However, this negative relationship could be attributed to several potential factors. For instance, simply increasing financial resources without addressing other critical aspects of education may not suffice. No matter how high the school expenses are, ignoring teaching quality, curriculum, or student support services will still result in decreased graduation rates. Along with this, the small  $R^2$  indicates that roughly 10% of the variance in high school graduate rates can be explained by changes in current expense per ADA. This suggests that while there is a discernible relationship between the two variables, a significant portion of the variation in

Fig 2. Regular HS Diploma Graduates (Rate) vs. Percent (%) Eligible FRPM



graduation rates remains unaccounted for and is likely influenced by other factors not considered in this part of the analysis. Thus, it is crucial to recognize that current expense per ADA alone cannot completely explain high school graduation rate. Further investigation will be necessary to gain a more comprehensive understanding of the observed negative relationship and whether or not school finances are always spent as efficiently as they should be.

For the second analysis examining the percentage of students eligible for free or reduced-price meals, our findings aligned with our expectations. The negative correlation between high school graduation rate and the percentage of students eligible for free or reduced-price meals is consistent with the findings of the study conducted by Houck and Kurtz in southern states. In fact, aligned with their findings, among the two factors considered, the percentage of students eligible for free or reduced-price meals emerged as the preferred and more relevant determinant of graduation rates. This observation could be driven by the socioeconomic disparities and challenges faced by students from low-income communities and households. These challenges may include limited access to educational resources, inadequate support systems in schools, and more academic obstacles. Such barriers can hinder academic achievement and impede progress towards high school graduation. These results warrant further analysis in order to fully comprehend the underlying factors driving the observed negative relationship between the percentage of students eligible for free or reduced-price lunches and high school graduation rates.

Our analysis using the data from the California Department of Education sheds light on the relationship between current expenses per ADA, percent of students eligible for free or reduced-price meals, and graduation rates. By analyzing this data, we have gained a deeper understanding of the factors that may impact graduation rates in the state of California. These findings provide valuable

insights to policy-makers in the state. Continued research and data analysis in this area will be vital for driving positive educational outcomes and ensuring equitable opportunities for all students in California.

In our study, we adopted a single-variable approach, focusing on analyzing one independent variable at a time. However, both of our outcomes yielded relatively low  $R^2$  values. This suggests that the quality of education is a comprehensive matter influenced by multiple factors beyond any single variable. It becomes apparent that education quality cannot be solely explained by any single factor, such as school funding or socioeconomic status. To properly assess the determinants of quality education, it is imperative to conduct multivariate analysis and examine multiple variables simultaneously, as education is dependent upon an interplay of multiple factors.

## **VIII. RECOMMENDATIONS**

In order to gain a comprehensive understanding of the complex relationship between poverty and education, it is essential to consider a broader range of variables that may influence quality of education. Future research should aim to expand upon our findings by investigating additional factors other than school finances and socioeconomic status of families that may affect education in underserved schools and among underserved students. Firstly, parental involvement often has a huge impact on a student's education. Their support, engagement in school activities, and communication with teachers are consistently linked to improved academic performance [5]. Secondly, teachers are considered the most influential determinant in how much a student learns, meaning it is necessary for them to be qualified. A teacher's qualifications, experience, subject knowledge, and instructional methods all play a role in impacting educational achievement [10]. Not only this, but student-teacher ratios are a vital element of educational quality. Without a sufficient number of qualified teachers, it makes it



challenging for teachers to give individual attention to students and address their specific needs. Lastly, extracurriculars play an essential role in the holistic development of students and provide them with opportunities for social interaction, teamwork, creativity, and personal growth [3]. Cutting or reducing extracurricular programs such as sports, music, art, and clubs can severely hinder education quality.

Additionally, there are numerous other types of studies that can contribute to the investigation of the impact of poverty on education. To begin, the interdependence of poverty with other factors, such as race, ethnicity, gender, and disability status has a profound effect on education. By investigating how multiple aspects of disadvantage interact, we can reveal how they compound and influence academic opportunities and performance. On top of that, longitudinal studies are exceptional at identifying changes over time and diving deeper into cause and effect relationships. Conducting a longitudinal study that follows students from early childhood through their educational journey can display and help understand the long-term effects of poverty on academic performance. This can provide insight into the overall impact of poverty over time and help identify development periods where interventions may be most effective. However, these studies are extremely time-consuming and expensive and are therefore outside of the scope of this paper.

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